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ABSTRACT

Because of increasing competition resulting from globalization of the economy, Oregonians have, in the past 8 years, experienced declines in income and standard of living despite the creation of 300,000 new jobs in the state. Many experts have stated that work organization and management style are the key to gaining the competitive edge in an increasingly global economy. High performance work organizations are firms that give top priority to product quality and customer service and that achieve high levels of productivity, efficiency, and innovation by giving frontline workers better skills, broader responsibility, and more authority. Oregon has good reason to encourage its firms to consider the high performance model. Included among the actions that Oregon might consider to promote the high performance model are the following: informing business, industry, and educators about the model and its potential for improving productivity and competitiveness; establishing a training fund to be managed by business and labor; providing technical assistance to firms; establishing continuous improvement users' groups; teaching high performance in schools from middle school onward; making the Oregon Quality Award available to all firms; and adopting International Standards Organization certification as a new Oregon benchmark for key industry development. (Contains 34 references.) (MN)

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HIGH PERFORMANCE WORK ORGANIZATION

Improving Oregon's Competitiveness In The Global Economy

A Report to the

Joint Legislative Committee on Trade and Economic Development

September 22, 1992

By

Tami Lohman, Policy Analyst

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HIGH PERFORMANCE WORK ORGANIZATION

Improving Oregon's Competitiveness In The Global Economy

EXECUTIVE SUMMARY

Many American businesses today are adopting the "high performance work organization model" in order to make themselves more competitive--a situation that presents Oregon with an opportunity to improve its economy by helping its firms make the same transition. Over the last decade, the crowded global economy has changed what makes businesses competitive. Product quality, customer service, and speed have emerged as market priorities. Most American firms have not yet responded successfully to these changes, but foreign firms have. Their market share improved dramatically in the 1980s. The source of their success can be traced to a new model for organizing and managing business called the high performance work organization. The effectiveness of this model has been tested and proven in the U.S., making high performance one of the most important economic development strategies of the decade. High performance has the potential to make Oregon's industries more competitive and help raise the state's standard of living above the national average.

Even though Oregon's economy produced over 300,000 jobs in the last eight years, Oregonians' incomes have fallen and average real wages have declined over the same period. Per capita income, for example, has registered only 92 percent of the national average for nearly a decade. Many reasons have been offered to explain why the state's standard of living has fallen in spite of impressive job growth, but the most compelling reason is that Oregon's economy is becoming less competitive.

The globalization of the world economy has produced a marketplace where competition is keener than ever before. Japanese and European firms have emerged as world leaders in industries that used to be strongholds of American business. What has allowed foreign firms to get ahead? Many experts say it is not superior knowledge or even a superior workforce, but rather a remarkable work organization and management style--the high performance model--that enables foreign firms to be more responsive to consumers.

High performance work organization is the term used to describe firms whose top priorities are product quality and customer service. They are firms that achieve high levels of productivity, efficiency, and innovation by giving frontline workers better skills, broader responsibility, and more authority. They achieve significant flexibility by organizing workers into teams that produce entire products and by developing production systems that can be quickly and easily adjusted for custom orders. They are also capable of achieving unprecedented levels of defect-free products by teaching quality control to frontline workers who then apply controls throughout the production process.

The structure of the high performance firm stands in sharp contrast to the increasingly dated mass production system used by most American firms. Mass production's assembly line system is most efficient at producing large lots of standard products, but it is not flexible enough to produce the small batches of custom goods that customers demand today. In the 1940s and 1950s, the marketplace was less crowded, consumers had fewer options, America had the best technology, and mass production was quite effective at meeting the

needs of most buyers. Today, the global marketplace is crowded with companies offering so many choices to consumers that competitive firms must be able to distinguish their products and act quickly to capture market share. The high performance work organization is designed to give firms this ability.

In order to stay competitive, a number of American firms, including some in Oregon, are transforming their operations into high performance workplaces. These firms have seen dramatic improvements in profits, productivity, product quality, customer satisfaction, and employee morale. Yet, the majority of firms have yet to make a choice between high performance and the status quo. It is a choice they must make eventually, and how they choose will have a crucial impact on America's standard of living. Why? Because the competitiveness of the nation's businesses is directly related to how profitable they are, and profitability drives the level of wages firms can pay, the taxes they generate, and the quality of life they can support.

Government will want to consider helping firms choose the high performance option. Firms that choose high performance, choose to compete with the most efficient, productive companies in the world. If they are successful, they raise the quality of their operations, workers and products to the highest international standards. Firms that compete at this level will require highly skilled workers and will be more likely to pay higher wages. Firms that do not choose to change will be choosing to compete with lower skill, lower wage operations. Most likely, they are not firms that will be able to support the state's objective to provide Oregonians with family wage jobs.

High skills and high wages are important reasons why encouraging high performance makes sense for Oregon. But, high performance is also important for making small businesses competitive, helping firms that export internationally, and ensuring the success of the state's school reform initiative. Small business, for example, must compete with larger firms that adopt the high performance model, and high performance firms are requiring their small business suppliers to adopt high performance practices. Oregon's exporting firms also have cause to consider the high performance model, since many manufacturing firms wishing to trade with Europe after 1992 will be required to meet a strict set of production standards called ISO 9000. which the high performance model can help them meet. With regard to school reform, helping firms adopt high performance practices could create more demand and opportunity for the more highly skilled workers that the state's new programs are expected to produce.

Oregon has good reason to encourage its firms to consider the high performance model. Helping them become more productive, efficient, and competitive can lead to improvements in income and wages for Oregon workers and, ultimately, to improvments in Oregon's standard of living. Some actions the state might consider to promote the high performance model include:

- **Spreading the News** - to industry associations, businesses, and educators about the high performance model and its potential for improving productivity and competitiveness.

- **Establishing a Training Fund** - that would be financed and managed by business and labor for the purpose of making grants or loans to individual firms to help them cover worker training costs associated with implementing high performance practices.

- **Providing Technical Assistance To Firms** - that want to transition to the high performance model. Also, developing expertise on Total Quality Management, including reorganization, statistical process controls, quality management, benchmarking, Just In Time inventory control, team building, and other relevant subjects at the state's community colleges and universities. Schools might consider working with industry to develop curriculum needed to make these programs available to all Oregon firms.

- **Establishing Continuous Improvement Users Groups** - among Oregon's small- and medium-size firms to help them improve productivity by starting and following through with high performance programs. CIUGs are usually composed of three to eight firms that agree to meet together with a facilitator once every six weeks for one year to work on improvement projects such as organizing frontline workers into teams, reconfiguring manufacturing operations, implementing quality control, Just In Time inventory management programs, and reducing set-up time for small lot manufacturing. Key industry associations and small business development experts could work with the state to develop a CIUG program and identify individuals to facilitate the establishment and work of the CIUGs.

- **Teaching High Performance In Schools** - at the middle school and high school level, as well as in community colleges and university business school programs. Teaching students how to work in teams and monitor quality at an early age could go a long way toward producing workers who require less training and are more productive in the future.

- **Making The Oregon Quality Award Available to All Firms** - that meet the high standards of the award each year, rather than recognizing only one firm. By designing the award more like a quality certification program, a greater number of firms may be inclined to apply, and more importantly, would have an incentive to adopt high performance practices and improve the quality of their products and their competitiveness.

- **Adding ISO 9000** - certification as a new Oregon Benchmark for key industry development, and developing a certification assistance program for businesses, possibly through the state's key industry associations.

HIGH PERFORMANCE WORK ORGANIZATION

Improving Oregon's Competitiveness In The Global Economy

INTRODUCTION

Oregon's economy has grown by 300,000 jobs in the last eight years, yet the last time Oregonians earned more than the national average was in 1978. Per capita income--one of the most widely recognized indicators of economic well being--has registered only about 92 percent of the national average since 1983, and average real wages have fallen almost every year since 1977. It is hard to understand how Oregon's economy can create so many jobs without raising its standard of living. Many reasons have been offered for the decline: dwindling timber supplies, falling farm employment, automation, a growing low-wage service sector, even poorly educated workers. While these have surely contributed to the situation, they are not the toughest problem--competition is.

Businesses in Oregon and the rest of the country are facing the largest and most competitive marketplace the world has ever known. Over the last ten years, businesses from Asia and Europe have emerged as leaders in industries that were dominated for decades by the U.S. In too many cases, their firms are manufacturing products that cost less but offer better quality, variety, and customer service than our own. Japanese automobiles are an obvious example. French airplanes and German machine tools offer others.

What has given foreign firms their edge? It isn't access to markets; the U.S. is still the largest consumer market in the world. It isn't natural resources; we still have more than any other nation. It isn't a smarter workforce; Japanese auto plants in California, Tennessee, Kentucky, and Ohio employ mostly Americans, and they are the most competitive factories in the industry. What does appear to have given an advantage to foreign firms is the way in which they organize and manage their businesses.

Many of the best foreign firms have been organized around what this report loosely defines as the high performance work organization model. In the high performance framework, firms put customers and quality first. They structure their factory floors and train their workers in ways that enhance flexibility, dramatically reduce defects, and promote continuous improvement. In sharp contrast to the mass production system still favored by most U.S. companies, the high performance model allows firms to respond more rapidly and efficiently to market changes and, perhaps most important of all, measurably improve worker productivity.

Without adopting similar manufacturing strategies, U.S. firms cannot continue to compete on the same scale or at the same levels as they have in the past. The last ten years of decline indicate that without change, income and wages will continue to fall, and with them, our standard of living. High performance offers Oregon and the U.S. a proven strategy for improving industry competitiveness. The purpose of this report is to discuss how high performance can help Oregon's firms compete and why and how the state might facilitate firms' efforts to become high performance work organizations.

I. HIGH PERFORMANCE IS CRITICAL TO COMPETITIVENESS

Helping firms transition to the high performance model may be one of the most important economic development strategies of the decade. It might also be one of the newest, since state governments traditionally have not been involved in or concerned with how firms organize and manage themselves. Conventional government programs have focused on things that are *external* to firms such as tax credits, trade sanctions, loan guarantees, regulations, and infrastructure. Rarely has government worried about what went on *inside* a business. The last ten years of competing against the more effective management systems of foreign firms is changing that.

The success of the high performance model has demonstrated repeatedly that how a firm is structured and managed has a tremendous impact on the firm's productivity and profitability, both of which determine the wages firms can pay and consequently, the standard of living they can support. States that want to help their firms compete in the global economy *and* raise average wages and per capita income will want to consider new policies and programs for helping firms transition to the high performance model.

Globalization Has Dated The Mass Production Model

Looking at the impressive track record of foreign firms raises questions about how and when the tide changed for U.S. firms. The explosion in international trade during the 1980s may offer the best explanation. In the last decade, many more countries and companies entered the world marketplace. Within the U.S. itself, reliance on international trade increased dramatically. Commerce Department data shows that between 1979 and 1989, the sum of imports and exports grew from an amount equal to 55 percent of U.S. manufacturing output to 82 percent. This has had at least two major impacts on businesses. First, it dramatically increased the number of firms with which they must compete, and second, it changed what makes a firm competitive.

With regard to the first effect, adding more firms to the market gave consumers more choices. At the same time, growing personal incomes during the 1950s and 1960s gave consumers the financial means to be more choosy and to demand customization of more goods and services. Both of these trends--more firms offering more product options and consumers with more buying power--combined to create an extremely competitive, customer-driven marketplace.

These changes contributed to the second effect of globalization--changing what makes firms competitive. In the global marketplace, speed to market and customization are what makes firms competitive. Yet, the old American industrial advantage was not built on speed or variety; it succeeded on volume and access to natural resources. For over a decade, many American firms have seen the value of those advantages depreciate as their old ways of manufacturing have become dated by the global economy.

Forty years ago, American industry was faced with an enormous and rapidly growing domestic market. Industry responded by developing the mass production manufacturing system. Huge factories were built around assembly lines that could crank out hundreds or thousands of standardized products per day. The assembly line revolutionized production and positioned America far above the rest of the industrialized world. Of course, the system had it warts. It was not flexible enough to produce more than one or two models at a time, and major investments were required to retool for new ones. Also, if any part of a line broke

down, the entire operation could grind to a halt, idling nearly every worker in the plant. This made it necessary to carry huge inventories of parts at various stages of production to keep the line moving. Large inventories were expensive to store and camouflaged quality problems. Despite these drawbacks, in the limited international market that existed then, mass production enabled American industry to meet demand, and it established America as the world's industrial leader.

Things changed after World War II. Foreign firms began to excel in areas where the mass production system was weak but their own craftsman tradition was strong--by serving high value niche markets with superior service, quality, and flexibility. Lacking the resource base of American firms, foreign firms also invested heavily in human resources and technology. The combination of these strategies--niche markets, quality, customer service, flexibility, highly skilled workers, and technology--evolved into the successful high performance model.

High Performance Works Better in Highly Competitive Markets

For many industries, the high performance model appears to be better adapted to competing in today's crowded global marketplace. Its flexible manufacturing systems allow firms to more easily and efficiently develop new products in response to rapidly changing technology and consumer demand, staying one step ahead of competitors. Its focus on the customer keeps its investments on target and its quality high. Its flatter organizational structure improves communication between workers and managers and is less costly. And, its highly skilled workers are more innovative and productive.

A number of American firms have come to these same conclusions, and they have begun transitioning from the hierarchical, assembly line system to the high performance model. Many are claiming impressive results. One of the best examples may be found in the New United Motors Manufacturing plant (NUMMI) in Fremont, California. According to a report on the automobile industry by the U.S. General Accounting Office, NUMMI is a joint venture between General Motors and Toyota, who reopened the plant after it was shut down by GM in 1982. Prior to closing, the plant suffered from low productivity and poor quality. Employees filed 7,000 labor grievances a year, and on any given day, 30 percent of the plant's employees would be absent. Toyota reopened NUMMI two years later and, without making changes in equipment or employees (almost all of their hires were former plant employees), NUMMI is now producing the highest quality cars of any GM facility. The only significant difference between the old GM plant and the plant run by Toyota is Toyota's high performance management system.

As the NUMMI example shows, the high performance model is not something that works only in Japan or Germany. American workers at U.S. wages with U.S. technology also can compete with foreign firms, if they are trained and organized in ways that allow them to maximize their abilities.

In Oregon, a number of firms have adopted the high performance model, including Warn Industries of Milwaukie; OECO, also in Milwaukie; Northwest Aluminum in The Dalles; Domtar Decorative Panels of Albany; and Ashton Photo of Salem. Examples from their experiences are used to illustrate the practices described in this report, and a brief profile of each firm is included in the Appendix.

High Performance Means Higher Wages, Higher Living Standards

Successful foreign firms are doing something right. They have made major gains in market share and on average, their manufacturing workers' wages have increased steadily since 1960. In fact, for the last four years, the manufacturing wages of German workers have been higher than ours. In the U.S., between 1979 and 1989, factory worker wages fell some 6 percent, and in Oregon, between 1982 and 1990, average real manufacturing wages fell 16 percent.

A major part of the decline in U.S. wages can be attributed to the cost cutting measures of managers who are trying to compete in the global economy. In response to falling sales and shrinking market share, managers have tried to hold prices down to competitive levels by cutting worker wages, automating more functions (which eliminates jobs), or simply relocating to low-wage countries. The rigidity of the assembly line system and a lack of awareness about alternatives like the high performance model has made these options more attractive than trying to raise productivity or product quality.

But, cutting worker wages and relocating to China or Mexico are short term strategies that force firms to compete on the basis of price alone. It places them in a competitive contest with Third World countries to see who can produce products the cheapest. Even the winners in that contest are losers in the long run, because cutting wages does nothing to improve product quality, worker productivity, or the future prosperity of the business. Neither does it improve a state's standard of living.

Adopting high performance practices does. Firms that pursue a high performance strategy will compete on the basis of value added and quality, and they will compete with best firms in their markets. They are the firms that will make long term investments in worker training and technology. And they are the firms most likely to earn higher profits and pay higher wages. Oregon may be able to help itself to a higher standard of living, by helping its firms choose a high performance strategy.

II. WHAT IS HIGH PERFORMANCE?

The term "high performance work organization" was first popularized in a report by the National Commission on the Skills of the American Workforce. The report, titled *America's Choice: High Skills or Low Wages!*, suggested that national "productivity in the 1990s will climb only if the strategies of American employers are redrafted to include serious investments in work reorganization and worker training." Reorganization and training are two of a number of actions taken by high performance firms to make themselves more competitive. This section of the report describes several of the actions and policies of high performance firms and offers examples of how they have been implemented by a handful of firms in Oregon and the United States.

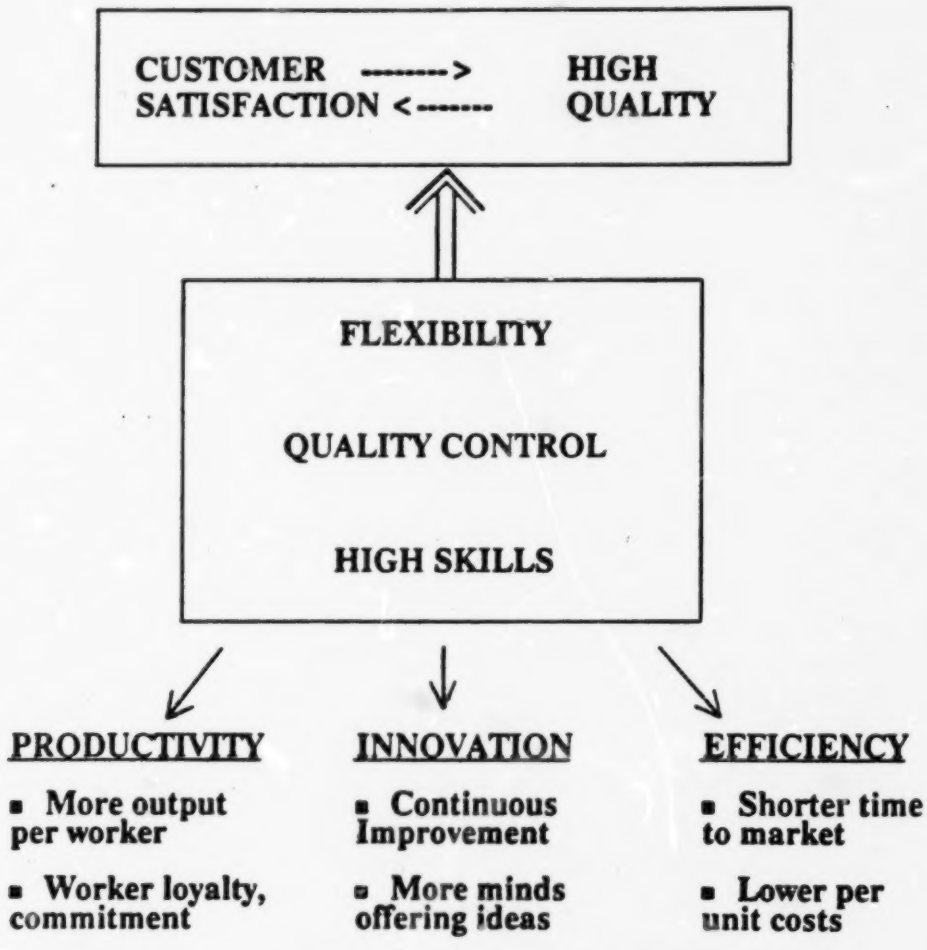
In general, the high performance firm is characterized by its commitment to two things: customers and quality. But it is the way in which the firm meets these commitments that distinguishes it from traditional firms. As shown in the chart on the next page, the high performance firm achieves its twin goals of customer satisfaction and quality through:

1. **Flexibility**: Structuring its manufacturing processes to be flexible, so that both workers and equipment can be quickly and cost-effectively reorganized to produce new or different products.

2. **Quality Control:** Making quality control the job of every worker, from the filing clerk to the mechanical engineer.

3. **High Skills:** Giving workers extensive training and a commensurate amount of responsibility, so that they have the skills to do many jobs and the authority to apply their skills in innovative ways.

THE HIGH PEFORMANCE SYSTEM



The benefits of this type of business system can be significant. They include productivity gains which can occur when workers have better skills and more opportunity to employ them. Innovation can increase when a larger majority of workers share responsibility for improving products and services. And, efficiency gains naturally follow when defects and inventory carrying costs are reduced while new products are developed more quickly.

Reading about high performance may leave one with the impression that it is a fixed formula, or that it is easy to distinguish between firms that are and are not "high performance". This is not the case--high performance is an umbrella term that covers a varied collection of tools, policies, and practices that can help firms become more competitive. The following eight sections attempt to describe specific aspects or policies that are among the most common practices of high performance work organizations. It is important to understand that a firm can be a high performance work organization without embracing all of these practices. In fact, most high performance firms probably have not incorporated them all. The elements described below cover the most common and perhaps the most important elements of high performance. Taken together, they establish a flexible framework into which many firms may fit.

1. Customer Service: Everyone Is A Customer

With so many competing firms in the world, the only things that separates one firm from another in some industries are product quality and customer service. Firms that want to distinguish themselves must deliver the best quality possible to exactly the specifications required by the customer. To do that, the firm must have highly skilled workers who know who the customer is, what the customer wants, and how to produce it.

High performance firms put a premium on satisfying their customers. They often encourage customers to actively participate in the company's process for developing and improving products and services. Customers of high performance firms may be invited to visit the firm regularly to talk to workers on the shop floor about problems or new ideas. When customers have problems with products, they are more likely to meet with the worker(s) whose job is most closely associated with the problem than with a customer service representative.

Warn Industries offers a good example of customer service from a high performance company (see Performance Profiles in the Appendix). Located in Milwaukie, Oregon, Warn manufactures 4-wheel-drive hubs, winches, and other after-market truck parts. Since transitioning to the high performance model in 1989, Mike Warn, the company owner, no longer sends sales representatives to deal with customer problems. "We no longer send our salesmen back (to the customer)--we send the people back (t)here that make the hubs . . . If (the customer) has a problem with packaging, we send the person that does the packaging back to see the guy that unpacks it, so the two of them get together."

This kind of customer service may seem like a small thing, but it can vastly improve a firm's responsiveness, and it can dramatically reduce the time required to resolve problems. For many customers, the open-door, open-floor policies of high performance firms lets them know that the company takes them seriously, wants input, and will deal directly with their needs.

This same level of customer service may also be apparent inside the high performance firm, because everyone is a customer in the high performance context. Frequently, workers inside the firm are called *internal* customers, while other companies or individuals who buy the firm's products or services are considered *external* customers. The label of "internal customer" has meaning, because it captures the way in which fellow employees are to be approached and appreciated within the high performance firm. At Warn Industries, workers refer to each other as customers.

2. Quality: A Shared Responsibility

Product quality is the other top priority of the high performance firm. American firms are being challenged to offer products whose quality is as good or better than those of the Japanese and Europeans. In the automobile industry, for example, it means building cars with the efficiency and economy of the Honda and the comfort and reliability of the Mercedes. It is a difficult challenge, but high performance companies in many U.S. industries are setting high goals for quality. Motorola, for instance, has set an unprecedented goal to have 60 or fewer defects in every billion components made.

How do high performance firms raise quality to these levels? Typically, they do two things. First, they install comprehensive quality control systems throughout the firm. Statistical process control (SPC) systems are common. Their purpose is to minimize variations and reduce or eliminate defects in products. SPC involves testing variables that affect the quality of a product under differing conditions and ultimately determining the range of inputs and circumstances needed to produce defect-free, high quality products.

The second way firms improve quality to make quality control the job of every worker. In many cases, frontline workers, not just engineers or quality control specialists, are trained to understand SPC and to interpret and apply it by making adjustments to machinery, materials, and labor. In Warn Industries and at OECO, another high performance company in Milwaukie (see Appendix), workers post the graphs and charts produced from regular SPC testing just outside the entries to their work stations as evidence of the quality of their efforts.

Vesting responsibility for quality control in frontline workers offers the high performance firm three advantages. First, it can significantly reduce the need for separate quality control staff. At OECO, training workers in SPC has allowed the firm to reduce its quality control staff from 60 to 5, while it improved scrap and reject rates from 9 percent of sales to 3 percent. This saves money for OECO, and it also saves money for customers who no longer need to spend as much time inspecting or returning OECO parts.

The second advantage is that quality control is exercised throughout the manufacturing process, not just at the end, after the product has been manufactured. This allows the firms to spot and solve problems earlier or prevent them from happening at all.

The third advantage of controlling quality at all stages of production is that it supports the practice of continuous improvement, a principle common to high performance firms and a part of a popular business improvement strategy called Total Quality Management. Continuous improvement embraces the notion that production and products can always be improved, even when they are working well. Skill in statistical quality control gives workers valuable information for developing effective ideas for improving products and processes.

SPC has become an important standard for competing in the global marketplace. Many Japanese firms now insist that their suppliers have statistical controls in place. The Office of Technology Assessment reported on the results of a recent survey of Japanese-owned subsidiaries in the U.S. that showed that 83 percent of these firms "viewed a comprehensive SPC program as the most important criterion for choosing suppliers." In addition, 62 percent ranked "quality as the most important factor in purchased components."

3. Responsibility: Workers Make More Decisions

In traditional American companies, workers' jobs were shaped by the Taylor model of scientific management. Developed by Frederick W. Taylor at the turn of the century, the model reduced each step in the production process to simple tasks which workers performed repeatedly, thereby minimizing opportunities for variation or error. The production process in those days, and in many workplaces still, was characterized by long assembly lines manned by hundreds of workers who punched the same holes, wrapped the same wires, stamped the same metal plates, or sewed the same zippers over and over again. The major responsibility of each worker was to meet minimum production quotas established by management.

Usually, workers were not encouraged to think about their jobs or improve the production process--that was management's job. In fact, workers producing more than required in that environment could overwhelm the next worker in the system and upset the flow of the assembly line. According to Ray Marshall, former Secretary of the Department of Labor, "The mass production system organized work so that most thinking, planning and decision making was done by managerial, professional, and technical elites. Line work was simplified so that it could be done by relatively unskilled workers."

In the high performance workplace, workers have much more responsibility. Instead of repeatedly performing the same task, workers perform many, if not all, of the tasks required to produce major components or entire products. To make this possible, workers in high performance firms are cross-trained to perform many tasks which gives them broader skills, greater depth of understanding about the total production process, and vastly improved ability to predict, prevent, and resolve problems. To keep their skills sharp, workers may rotate jobs on a regular basis, often working at more than one job in a single day.

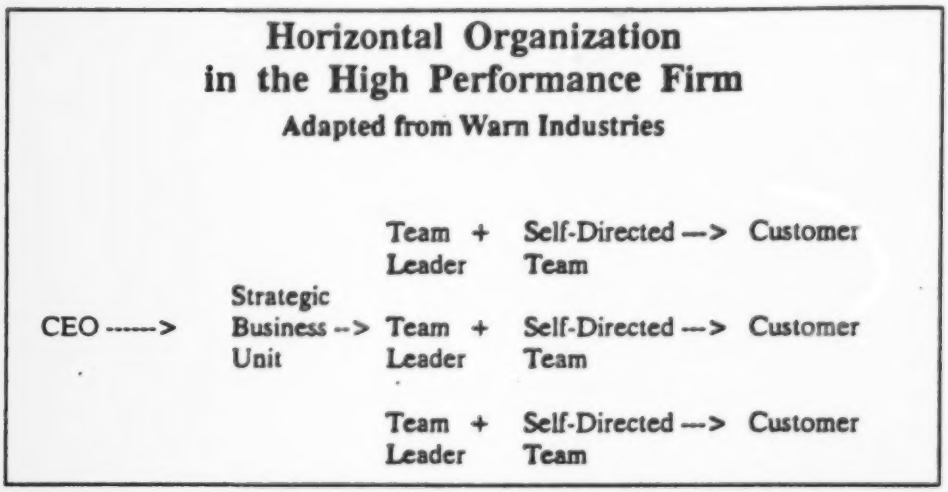
Responsibilities that used to be the exclusive domain of managers are often delegated to workers in high performance firms. For example, teams of workers may set their own production schedules, order materials, conduct quality control, schedule vacations, hire and fire team members, and set production goals. Workers may be given substantial time to meet, discuss issues, resolve problems, and develop better ways of doing things. In some firms, they are even allowed to shut down operations in order to make adjustments or repairs. At the NUMMI automobile plant in Fremont, California, workers may pull a clothesline hanging over the assembly line when they run into a problem. The assembly line stops when the clothesline is pulled, and team members gather together to solve the problem.

4. Structure: Many Firms Within A Firm

Typical American firms have been structured like pyramids, with the CEO at the top of ever-widening layers of vice presidents, division heads, department managers, technical staff, sales and marketing staff, personnel departments, supervisors and foremen, and finally, at the bottom, the frontline workers. In this arrangement, employees report upwards, and the boss becomes the workers' major customer.

In the high performance firm, the old hierarchical management system has essentially been laid on its side, and layers are fewer and wider, with the boss at one end of the chain and customers at the other. This arrangement pushes decision-making responsibility further down the chain of command and focuses the entire company on pleasing the customer.

The simplified version of Warn Industries organizational box on the next page shows how workers are grouped into teams that are responsible for major product lines serving a single customer. Managers are called Team Leaders and are often elected by the teams themselves. At Domtar Decorative Panels in Albany, for example, teams elect new leaders each quarter (see Appendix).



Reorganizing workers into teams, sometimes called cells, seems to be one of the most common changes made by high performance companies. Teams may consist of 5 to 20 workers, sometimes more, who in combination have virtually all of the skills required to design, produce, and deliver an entire product. In some high performance companies, teams are organized by product. In others, they are organized by customer.

At OECO, where workers design and manufacture power conversion electronics, teams are organized around and named after OECO customers, such as the Unisys team and the Digital team. These teams are completely responsible for designing and delivering products for OECO customers, operating much like a collection of smaller firms within a larger one. This type of organization keeps workers focused on the customer and can lead to better customer service and product quality.

OECO also co-locates its team members on the shop floor. The desks of engineers and planners are located next to those of the machine operators and technicians on their teams. This practice facilitates constant communication between workers and allows problems to be resolved without having to schedule meetings. Taken together, cross training and co-location can minimize the disruption caused when one or more team members are absent, since workers can more easily substitute for one another.

5. Flexibility: High Performance is Faster, More Responsive

Flexibility may be the most critical difference between traditional and high performance firms. It is often difficult and costly to adjust fixed assembly lines for individual customer orders. Customers usually have to settle for the company's standard product or wait for months while the firm re-engineers, re-tools, and re-trains to produce the desired model.

HIGH PERFORMANCE VS. TAYLOR

HIGH PERFORMANCE	TAYLOR MODEL
CUSTOMER SERVICE	
■ Customers see and know team members and talk often	Customers see only sales staff
■ Fellow workers think of each other as customers	Workers have no "customers", only bosses and co-workers
QUALITY FOCUS	
■ Comprehensive quality control; Often use SPC, applied at all levels	Quality control usually done only at end of production process
■ Most workers trained to conduct own quality control programs, including SPC	Only engineers, quality experts understand and apply SPC or other quality controls
■ Committed to continuously improving product quality	If it isn't broke, don't fix it
■ Long term relations with suppliers	Buy from supplier with lowest price
WORKER RESPONSIBILITY	
■ Teams produce whole products	Workers see only parts, components
■ Workers are cross-trained to do all team member tasks	Workers responsible only for their discrete task assignment
■ Workers rotate jobs	Workers do only assigned tasks
■ Teams order own materials, set production goals, schedules	Workers use only materials given; work on assigned schedules
■ Teams hire new workers	Personnel departments hire workers
■ Teams may halt production	Only foremen may shut down lines
■ Workmanship standards set to match best in the world	Standards set to the lowest common denominator
STRUCTURE	
■ Flatter organization with fewer or no middle managers	Vertical organization with many layers of management
■ Workers organized in teams, each with own equipment	Workers function singly, in mass production/assembly line setting
■ Workers are co-located	Workers separated into departments

HIGH PERFORMANCE	TAYLOR MODEL
FLEXIBILITY	
■ Custom orders easily done; team structure and broadly skilled workers are flexible	Rigid assembly lines, narrowly skilled workers cannot respond to work order changes easily
■ Firms able to develop and introduce new products more often	Long lead times and high expense required to develop new products
■ No need to stockpile basic parts--products made to order when the customer orders them	Must stockpile basic parts in case of a production shutdown--leaves firm with inflexible inventory
■ Practices JIT delivery, achieves major cost savings	Short production runs too costly for assembly line/mass production system
TRAINING	
■ Training workers seen as key investment strategy	Training limited to management and white collar workers
■ Training provided in teamwork communications, leadership, basic skills, problem solving, quality control	Training usually only by vendors on equipment operation
MANAGEMENT PHILOSOPHY	
■ Workers should be trusted	Workers will do only minimum
■ Fewer rules, job classifications	Many rules, job classifications
■ Workers help set policy, mission, rules, and production goals	Only management sets company policy, rules, production goals
■ Workers propose equipment and training investments	Limited access to top manager; technology drives acquisitions
■ Kaizen systems set up to promote/reward worker ideas	Employee ideas not solicited; no solicitation systems established
COMPENSATION, SECURITY, EVALUATION	
■ Pay based on knowledge and skills	Pay based on seniority
■ More salaried workers	More hourly workers
■ Employee ownership programs and profit sharing common	Few employee ownership or profit sharing programs
■ Labor viewed as an investment	Labor seen as a variable cost
■ Evaluations used to raise quality; not usually tied to promotions	Evaluations linked to promotions, pay

Table format adapted from OTA Report, "Competing in the New International Economy, 1990."

Not so in high performance firms. The structure of the firm, the higher skills of its workers, and closer relationships with customers allow high performance firms to reconfigure equipment and/or integrate new machines to meet a customer's special request more quickly and efficiently than conventional operations. It also allows the firm to introduce new products more quickly and at less cost. Japanese firms excel at adapting products to meet customer needs and provide a wide variety of models and features to fill market niches.

As a result, American customers often look outside the United States to get the products they want the way they want them. The American textile industry offers an example. According to a recent *Business Week* report on a retail convention of textile makers, the owner of **The Limited** clothing company was lambasted by his industry peers for buying textiles from foreign firms. He responded by explaining that "U.S. mills simply don't offer the same quality, styling, or flexibility as offshore competitors." The chief executive of **The Gap**, another retail clothing store, concurred, saying that "he had to go to Korea to fill an order for sweatshirts when a U.S. manufacturer refused to make a 90 percent cotton blend."

While the way in which the high performance firm functions allows it to be responsive to the changing demands of the marketplace, it also leads to big savings for the firm. High performance firms can facilitate more easily Just In Time manufacturing practices which keep inventories low and cut storage costs. Traditional firms typically stockpile finished products they haven't sold (another reason traditional firms cannot afford to be more flexible) to serve as a buffer against occasions when the assembly line breaks down. Having engineering and maintenance expertise in each team of workers in the high performance firm minimizes down time and raises productivity, making high performance firms more productive more of the time.

6. Training: High Performance Requires Higher Skills

High performance firms require a better trained workforce to function effectively. In a team environment, workers need strong communications and personal skills, and to be able to produce whole components or complete products, and they need broader technical skills. In order to rotate jobs and exercise sound judgement about production problems and customer inquiries, they need specific functional training as well as skill in quality control techniques.

Thus, training is viewed as a key investment in high performance firms. Employees at Warn Industries, for example, manufacture four wheel drive hubs and other truck parts. Since the company transitioned to the high performance model in 1989, workers spend 5 to 10 percent of their direct labor hours in training. Company representatives say that training "has been the biggest investment we've made," in making the transition to high performance. Moreover, training is not a one-time event, but a continuous process that compelments notions of continuous improvement in production methods and products. High performance firms expect to continue investing in training as a means of progressively achieving higher levels of efficiency, quality and productivity.

In order to keep workers' learning skills sharp, some high performance firms offer workers incentives to get more education. Warn has a new policy of paying for tuition and books for any education class a worker takes--job related or not--as long as the worker gets a passing grade. Company managers explain that they wanted their workers "to get into in the learning mode" when the company was restructuring, since "so many of them hadn't been in a

classroom in years." The concept proved so motivating and effective, that it was continued after the transition was complete.

7. Management: The Commitment Must Start at the Top

As with any change in company policy or direction, management's complete commitment to the change is vital to its success. Workers alone cannot succeed in reorganizing themselves and their work around the high performance model without the support of top management. In each of the Oregon companies profiled in the Appendix, the transition to high performance began with and has been sustained by the companies' top managers.

Once the commitment to high performance is made, management will need to play a different role and adopt a different attitude about workers. Former Labor Secretary Ray Marshall explains that since "workers (in high performance firms) manage more of their own work, individually or in teams, there is less need for managers... The role of managers, therefore, changes in a high performance system from bossing or managing to supporting frontline workers who assume more responsibility for quality, productivity, and flexibility." Coaching or facilitating may come closer to describing the role of managers in the high performance firm.

Concerning assumptions about workers, Marshall writes that in the high performance firm, "managers assume... that workers and effective work organization, not managers or technology, are the keys to high performance. They assume further, that workers understand their jobs, are capable of higher order thinking and are motivated by positive reward systems, especially managers who value their work." In an environment where workers are constantly looking for ways to improve the production process and the product, managers will hear more about how they could fix this or that, than about how well things are running. They need to be capable of seeing the value in fixing things that may not be broken and encouraging and rewarding workers who do.

The Toyota manufacturing plant in Georgetown, Kentucky provides an example of the kind of reward system management might support in a high performance facility. Toyota employees are encouraged to submit "kaizen"--a Japanese term for suggestion--for improving the business. Ninety percent of the firm's 3,500 employees submitted at least one last year, and more than ninety percent of their ideas were implemented. Management rewarded employees with checks for $25 to $5,000 for their contributions. The largest award went to a worker who calculated the cost-savings of doing laundry in-house.

How do workers respond to this type of management? In Oregon firms, workers are enthusiastic. The typical response from production workers at Warn is that "Warn Industries is a great place to work," and "Mike Warn (the company's president) really cares about me; anytime I want to talk to Mike, I can do it."

8. Compensation, Security, Evaluation: Valuing the Worker

Compensation, job security, and evaluation programs are designed to encourage workers to improve productivity in many high performance firms. For example, workers are more likely to be salaried instead of paid by the hour. Employee ownership and profit sharing programs are common. Examples include Oregon Steel and Warn Industries. At Oregon Steel, a Portland firm that is in the process of transitioning to high performance,

employees now own 25 percent of the business. At Warn Industries, 15 percent of net profits are distributed equally to all employees every quarter.

Compensation in high performance firms is more likely to be based on skills and knowledge, rather than seniority. To give workers an incentive to develop new and better skills, salaries are increased in proportion to the skills and expertise employees acquire. One example was described by *Business Week* as a pay-for-knowledge plan at General Electric's plant in Salisbury, North Carolina. Employees there "can raise their salaries by completing company-funded courses in technical, economic, and behavioral subjects." Warn Industries is developing a similar pay-for-knowledge system. Warn employees describe it as "the more you learn, the more you earn" program. Workers who master certain administrative and social skills will earn 75 cents more per hour per skill learned and $1.00 per hour more for each technical skill they master.

Job security is also a vital part of the high performance environment. During down times, high performance firms are likely to try to keep employees on the job doing maintenance and repair, new product development, and other things to prepare for the next market upswing. Some high performance firms have adopted "no layoff" policies to protect their workers. According to the GAO, the NUMMI plant in California has a labor-management agreement that "provides for layoffs of workers as only a very last resort. Before workers can be laid off, work that is subcontracted out must be brought into the factory, and workers can be put on maintenance or given additional training. In addition, before any workers are actually laid off, management must incur a cut in their salaries."

This doesn't mean that high performance firms don't contract in tough economic times. Both OECO and Tektronix, another quality-focused firm in Oregon, have had to lay off workers when the high technology and defense industries slumped in late 1980s. What it does imply is that firms like Tektronix and OECO may try harder to keep workers on the job longer.

Other signs of the higher levels of management-employee trust in the high performance environment can be seen at Warn Industries where workers no longer punch a time clock, and the bells that rang for every break have been turned off. The company bronzed its old time clock and displays it in its lobby as a symbol of employee liberation. Workers are trusted to come to work on time and give their best to the job while they are there.

Performance evaluations also are treated differently in some high performance firms. Rather than subject workers to the typically intimidating and arguably fruitless annual evaluations most supervisors give, evaluation is treated as part of ongoing efforts to improve the business. At Warn Industries, teams evaluate themselves on a regular basis, although individual team members may request evaluations from their teams or team leaders at any time. The focus of evaluations is on improving team performance and product quality. Evaluations are no longer tied to compensation.

This is consistent with another attribute common to some high performance firms, which is that workers are not punished for making mistakes. At Ashton Photo in Salem, no supervisor keeps a tally of employee errors for review during annual performance evaluations. Steve Ashton, the company's owner, explains that errors are viewed as opportunities to learn and improve. His employees are encouraged to discuss their mistakes with team members and to share them in staff meetings with the entire company. This way,

everyone has a chance to learn something and share responsibility for finding ways to prevent recurrences. Steve feels this type of environment reduces stress and promotes risk-taking that can lead to greater productivity.

High Performance Gets More From Workers, Managers

The preceding sections touched on a large number of characteristics associated with high performance firms. Not all firms employ every one of these characteristics, of course, but most would seem to have at least the following:

- A company culture, strongly supported by management, that expects high quality, believes satisfying customers is the firm's most important job, and sees skilled, motivated, and empowered workers as the firm's greatest asset.
- A flatter organizational chart with minimal layers of supervisory management
- Better trained workers who work together in cross-functional teams that assume direct responsibility for quality control and customer service
- Quality as a high priority supported by company-wide statistical or other quality assurance programs
- Close, constant contact with customers and suppliers to assure satisfaction and improve service

Companies that adopt the high performance model potentially can achieve long term cost savings, a smarter, more productive, workforce, and a markedly more flexible firm. In combination, these benefits can make the firm competitive with the best in the world.

III. HIGH PERFORMANCE IS SMART STRATEGY FOR SMALL BUSINESS, WORKFORCE DEVELOPMENT AND INTERNATIONAL TRADE

Improving competitiveness and wages are not the only reasons why Oregon may wish to promote high performance. The model is also important for making small businesses more competitive, ensuring the success of the state's school reform initiative, and helping firms trade internationally.

- **High Performance Is For Small Business**

Major corporations like Xerox, Toyota, Federal Express, IBM, U.S. West, General Motors, Ford, and Motorola are reaping the benefits of their investments in high performance, but what about small firms? The high performance movement is just as important to small businesses as it is to corporate giants.

The reasons are simple. First, small firms compete against large firms, and to compete successfully, they must be more efficient and produce products that are as good or better. Yet, small firms probably have less time and fewer resources for adopting high performance practices.

Second, any high performance company producing competitive goods or services for the retail market (commonly called original equipment manufacturers or OEMs) must have

high quality inputs in order for its own products to be of high quality. This means that the smaller firms that supply *the high performance OEM must deliver high quality products and* services. Indeed, many larger firms are now insisting that their suppliers adopt high performance practices, such as statistical quality controls.

Third, high performance firms must be flexible, ready to change their products in response to a rapidly changing market. Likewise, the firm's suppliers must be flexible, ready to alter the products and services they provide in order to meet the needs of the OEM.

Fourth, and perhaps most importantly, high performance OEMs are changing the way they deal with their suppliers. As *Business Week* explained in a recent article, many large companies have treated "suppliers like disposable diapers, changing them frequently to get the best price." This practice did little to guarantee the OEM a stable source of supplies with minimal variation and consistently high quality. Today, American companies are beginning to realize that working with fewer suppliers over the long run, as the Japanese do, is a more efficient business strategy. High performance firms have already begun to pare down supplier lists and establish better relationships with those that remain. Xerox offers a case in point. Ten years ago, the company had over 5,000 suppliers: according to the Office of Technology Assessment, it buys from fewer than 500 today.

What does this trend mean to suppliers? Two very important things. First, it means a steady capital stream for those who make the list. A long term commitment from a major corporation guarantees the supplier a steady source of income that can be leveraged into new capital investment and expansion. Second, it means a better competitive position. Improving product quality and establishing a solid reputation with one OEM allows the supplier to become more competitive and capture new customers. And, new, long-term contracts with other OEMs also provides additional capital for investment and expansion.

For Oregon, where 85 percent of all businesses have fewer than 50 employees and many classify as suppliers, the high performance movement has opened a critical window of opportunity. Oregon firms could take the lead in becoming preferred, high performance suppliers. But the window will not stay open forever: once an OEM has established a relationship and invested in training and product development with a supplier, the OEM will be far less interested in switching to another firm. In the future, newcomers will have to work very hard to convince an OEM to change suppliers.

▪ High Performance Is Key To Successful Workforce Development

High performance work organizations and workforce development are really opposite sides of the same coin in a competitive economy. On the workforce side, workers must be highly skilled in order to compete for better jobs, higher wages, and a higher standard of living. On the business side, firms need highly skilled workers in order to produce quality goods and services. But, to get maximum value out of a highly skilled worker, *firms need to be organized in a manner that capitalizes on the higher skills of a well trained workforce.* The high performance model offers firms that advantage.

Over the last four years, Oregon has charted a course for establishing a world class workforce. The first priority of the Oregon Progress Board, the state body dedicated to keeping Oregon on a winning course for the future, is "to have the best educated workforce in the nation by the year 2000 and equal to any in the world by the year 2010." Landmark legislation has been passed to reform the state school system, from preschool through

graduate school, by raising educational achievement standards and developing industry-supported professional technical training programs for the 70 percent of students who do not graduate from a four-year college. Apprenticeships and professional technical certification programs are being developed to complement the state's traditional college preparatory programs.

The success of the school reform effort depends on the efforts of business and schools. The professional technical programs that are being developed will require direct assistance from industry to ensure that graduates get the skills that businesses need, including training in quality control, team work, and customer service. Business involvement is essential, because businesses are the customers of the workers that schools produce. Only they know what they need from the workers they hire, and only they can communicate those needs to the schools.

Schools, for their part, could, and perhaps should, be restructured around the high performance model. What better way to teach students about the value of working in teams, identifying and serving customers, and producing quality work than in school systems that demonstrate those principles in the way the are organized and operated on a daily basis? Portland State University's School of Business has embraced this idea, and began last year to reform its graduate degree program. Public schools, from kindergarten through high school, might consider taking similar action.

Oregon will see only a limited return on its investment in school reform unless businesses are structured in ways that enable them to take advantage of the highly skilled workers the state's schools will produce. Using the high performance model can go a long way toward helping Oregon firms more fully utilize highly skilled workers. But, without high performance, many new, highly skilled workers will have to find better employment opportunities somewhere else.

- **High Performance Could Help Export Firms**

International trade today increasingly requires firms to adopt high performance practices. The most visible requirements come from the new European Community which has adopted the ISO 9000, a strict set of production standards that must be met by firms wishing to trade in Europe after 1992. The standards cover many of the same operational issues addressed by the high performance model, including statistical process control, worker training, documentation and record keeping, materials quality control, contracting with purchasers, auditing, design, and research and development.

After 1992, many firms that wish to trade with Europe must be inspected and certified by an authorized body, and thereafter, they must be audited regularly to ensure continued compliance. The certification process involves personal inspections of the company's facilities and interviews with workers and managers. ISO 9000 is not a *product* certification program--it is a program for certifying the *process* used to manufacture products.

Failure to meet ISO 9000 standards will effectively exclude some companies from trading with Europe, particularly those firms in "regulated" industries such as toys and recreational equipment, pressure equipment, construction products, gas appliances, personal protective equipment, measuring and testing equipment, telecommunications terminal equipment, machinery, and medical devices. It may exclude U.S. firms from other national markets as well, including their own. ISO 9000 has recently been adopted by Canada,

Mexico, and Japan, while in the United States, the Food and Drug Administration and the Department of Defense are expected to adopt ISO 9000 requirements for the nation's medical products and defense industries.

In response, a number of Oregon firms are pursuing registration as ISO 9000 certified firms, including STC Submarine Systems in Portland which produces fiber optic cable; a laser scanner manufacturer called Spectra Physics in Eugene; Tektronix of Hillsboro; and Protocol Systems in Beaverton which produces medical electronics. Each of these firms has already encountered ISO requirements in requests for proposals from European firms. Firms like Tektronix that have adopted high performance practices say they find complying with ISO 9000 much easier than firms that have not. Each of the companies report that bringing their firms into compliance has produced significant net savings by improving efficiency and product quality.

Unfortunately, ISO requirements are complex and comprehensive. The application process itself is challenging, and few experts exist to help firms through the process, especially small firms with limited expertise and money. Without assistance, many firms may potentially be severely limited or even excluded from trading internationally.

Nobody Said It Would Be Easy

Persuading firms to consider converting to the high performance model could be difficult. Even though high performance practices have dramatically improved the productivity and profitability of a number of firms in Oregon and across the U.S, only a few have adopted the model. The following objections, including cost, disruption, and fear of change or failure are among those raised most frequently by reluctant firms.

1. **Costs** - can be high in transitioning to the high performance model. Workers will need training in new job skills and quality control, especially at the beginning of the transition process. Training is expensive. Additional equipment may also be needed for new teams to operate efficiently. These expenses may add up to a significant investment for a firm. However, the investment can pay significant dividends in the form of increased productivity, better quality, reduced production costs, higher profits, and improved employee morale. Also, some firms have been able to trade off part of the cost of their investment in training against savings achieved by reducing layers of management as well as minimizing defects, scrap, waste, and inventory.

2. **Time** - is required for results to materialize, and some companies do not want to wait. High performance is no short-term profit fix. It is a long-term strategy for continuously improving productivity and enhancing the firm's ability to respond to rapidly changing markets. Some firms may not see significant improvements for months, until workers adjust to the changes and master new techniques. Moreover, a halfway attempt at high performance probably will not succeed. According to a report on worker training by the U.S. Office of Technology Assessment,

> Companies that take a piecemeal approach to reorganization risk failure, particularly those that pick and choose Japanese production practices according to whether managers feel comfortable with them. It is entirely possible that the new approaches work because the elements are mutually interdependent. With only some of them in place, the system may perform poorly. Or improvements may be temporary, with the organization later

sliding back into its old ways--particularly if higher management does not buy into the entire agenda, but treats it as another way of manipulating employees.

3. Resistance from Middle Managers - who may lose their jobs or be asked to assume new responsibilities may cause companies to think twice about adopting the high performance model. Some firms have had to let go of middle managers when they made the transition, but many others simply reassigned them to new positions with new responsibilities within the reorganized firms. Some managers may become team leaders, while others return to technical positions they held before becoming managers.

4. Resistance from Workers - is not uncommon. Some workers, especially longer term employees, may be uncomfortable with change--even though it may be in their best interest. Managers can help alleviate worker fears and reduce stress by including workers in the reorganization process and explaining how the proposed changes will improve their jobs, give them more responsibility and higher skills, and help them make the company more profitable. Mike Warn took this approach with his employees when Warn Industries reorganized, and only five of over 400 employees elected not to stay.

5. Resistance from Unions - has been less frequent and less difficult than most managers expect. In recent years, some of the nation's major unions, particularly the UAW, have given strong support for "jointness," their name for the high performance team approach to shop floor production. Still, some union leaders question the motives of managers who propose to reorganize and redefine worker responsibilities, especially proposals to change the basis for pay raises from time-in-grade to skills achievement.

Transitioning to the high performance model takes more than changing a company's organizational chart. It requires an ongoing commitment to training to raise worker skills and keep them sharp. It requires comprehensive quality control, exceptional customer service and solid, long-term relationships with suppliers. Firms that have made these investments have experienced the upheaval that comes with transforming operations from the old, Taylor-style assembly line to the high performance model, but they are also enjoying the rich rewards of better productivity, profits, and employee morale.

IV. HOW CAN THE STATE HELP?

Helping Oregon companies adopt high performance practices can make our companies more competitive and raise average wages for Oregon workers. With legislative support, the state could play an important role in encouraging and facilitating businesses' efforts to transition to high performance. Below are a number of strategies the state might consider to promote the high performance concept and help businesses make a successful transition.

Spread the News -- Disseminate Information to Industry

High performance is a relatively new concept that embraces a large number of strategies for improving a firm's competitiveness, including Total Quality Management, statistical process control, quality function deployment, organizing workers and production processes around teams, benchmarking, Just In Time inventory management, customer involvement, etc. How do firms decide whether high performance is right for them, and where do they turn for assistance? To help businesses wade through the information

available and to help them find out who provides consulting services in these areas, the state could design informational materials and events to help businesses become informed about high performance. The state might also consider distributing information through key industry associations, Small Business Development Centers, community college and university business programs, business organizations such as Associated Oregon Industries, the Oregon Business Council, and Oregon chapters of national business associations and labor unions.

Set Up a High Performance Training Fund

The most significant cost associated with adopting the high performance model is training. Businesses that have converted from the Taylor-style operation to high performance such as Warn Industries, or that have started up as a high performance operation like Domtar (see Performance Profiles in Appendix), have found that workers and managers may need training in these three areas:

1) **Communications** - How to articulate ideas, problems, and needs in the workplace, how to manage conflict, and how to write.

2) **Teamwork** - Workers accustomed to functioning alone most of the day in an assembly line or at a piece of equipment may need training in how to function effectively in a team, including participating in group discussions, arriving at consensus, and sharing responsibility. Workers may also require cross-functional training in the technical activities of the team.

3) **Quality Control** - Workers will need to be skilled in interpreting and applying statistical data on quality in order to make adjustments that keep quality consistent. Skill in collecting the data needed to produce statistical information on product quality may also be needed.

Some firms also report that basic skills training may be needed by workers before they can successfully complete training in statistical process control methods, cross-functional training, or other technical training courses.

Training is expensive, and firms without a training budget may need assistance covering the cost. The state may be able to help business establish a fund from which loans or grants could be made to firms for training costs associated with transitioning to high performance. Models for this type of fund can be found in a few states, and one of the best examples is in California where business, in partnership with the state, established the California Employment Training Fund ten years ago. The fund has been used to help new and expanding firms pay for training workers. California's fund is overseen by a panel of business and labor representatives appointed by the Governor. The panel sets policy and rules for awarding grants, hires an executive director to manage the fund, and decides which applicants receive funding.

A fractional increase in the state payroll tax could be used to finance a similar fund in Oregon. Oregon firms might apply for grants or loans from the fund to help defray training expenses associated with transitioning to the high performance model. An increase in the present state payroll tax of 0.032 percent would collect about $10 million per fiscal year.

Another proposal, offered by the National Commission on the Skills of the American Workforce, recognizes the contribution that some firms already make to training their employees. The Commission has proposed establishing a one percent payroll tax to be paid only by firms that do not spend at least one percent of payroll on training. Funds collected under the tax would be used for worker training programs.

The state might consider working with business and labor leaders to determine whether such a fund is needed in Oregon and how it might be structured to best serve the training needs of Oregon firms.

Provide Technical Assistance to Transitioning Firms

Few high performance experts--companies or consultants skilled in high performance techniques--exist, and of the few, most are managers inside of high performance firms who have learned from experience. With support from the Economic Development Department and the direct involvement of businesses, the state's university business programs, community colleges, and small business development centers may wish to consider designing a basic training program in quality management that could be made available to firms statewide, especially small businesses. In addition, schools and SBDCs might consider working with firms to develop in-house expertise in business reorganization, quality control methods, Just In Time inventory management, performance measurement, and worker training in teamwork and self-management.

Some key industry associations have already taken the initiative in developing high performance programs for their member firms. The American Electronics Association, for example, recently solicited requests from its members to participate in a pilot project to test a new high performance "road map" developed by the association. Five volunteer firms will make a three year commitment to follow the road map which outlines a step-by-step process for transitioning to high performance. The program was designed by electronics industry experts and is based on the experience of firms like Tektronix which has implemented a Total Quality Management program. The state might consider supporting AEA's pilot firms and marketing the AEA program as a model for other key industry associations to consider adapting for their member firms.

Establish Continuous Improvement User Groups

Designed especially for small and medium size manufacturers, continuous improvement user groups (CIUGs) have been used by firms in New Jersey, New York, Michigan, Ohio, and other states to help smaller firms follow through on implementing quality improvement programs. A CIUG is a small group of firms that formally agree to meet on a regular basis for one year or more to work together on implementing high performance programs. Some high performance practices require a complete change of focus and culture within the firm that can be difficult to achieve without continuous support. The purpose of the program is to help firms start, and, most importantly, finish implementing various improvement programs.

The CIUG concept is similar to that of flexible manufacturing networks in that it brings together firms that can benefit from working jointly on similar projects. Some of the projects CIUGs have undertaken include: organizing workers into teams, reducing set-up time for small lot manufacturing, improving work flow in the production process, Just In

Time inventory management, identifying and eliminating waste, implementing statistical quality controls, and developing strategies for productive maintenance.

A typical CIUG might be composed of three to eight firms that pledge to work togther for one year. The president, a production manager, and a shop floor representative from each firm (the same individuals are required to attend each meeting) meet once every six weeks at a CIUG member's facility. At meetings, they tour the host firm, talk with employees, and critique the host firm's progress in implementing its quality improvement programs. The group focuses on implementation rather than theory, and they discuss new ideas, shared problems, and review each other's progress. Groups in other states have been established and facilitated by industrial extension service agents, university programs for industrial engineering and technology, and quality management professionals.

Oregon may be able to boost the participation of its smaller businesses in the high performance effort by establishing a CIUG program. Many resources exist for providing technical assistance to CIUGs, including members of the newly established key industry associations, community colleges, and Small Business Development Centers. The Legislature may wish to meet with the key industry leaders, the Economic Development Department, and small business development experts to discuss the potential of the CIUG model for Oregon firms.

Teach High Performance in High Schools and Colleges

The cost of training workers and managers would be far less in the future if high performance concepts were included in the curriculum of high school professional technical education programs, apprenticeship programs, and college business schools. Portland State University has taken the lead in this effort already by restructuring its graduate School of Business Administration around the high performance model. The school has eliminated departments, and starting this fall, classes will be taught by teams of teachers. Certain courses will be delivered to students on a Just In Time basis, meaning that students will be taught subjects like statistics when they are needed for specific applications.

In addition, PSU has revamped curriculum to focus on training students in performance measurement, quality control and functional deployment, teamwork dynamics, customer service, market research, finance, accounting, and environmental management. The curriculum has been designed to teach students about business as a "process", rather than an entity.

Oregon's community colleges are preparing a proposal for designing Total Quality Management curriculum that would be available to Oregon businesses. The colleges have been working with business leaders to draft curriculum that matches the interests and needs of the business community. Chemeketa Community College, for example, has joined with the Salem Chamber of Commerce and Willamette University to develop a programs for teaching and promoting Total Quality Management.

The state may wish to provide support for further development of the PSU and community college programs, as well as help Oregon's high schools add programs to teach students how to work in teams, serve customers, statistically control quality, and build flexibility into their workplaces and themselves. The state may also wish to consider drafting new benchmarks for education and workforce development that make a priority of teaching high performance concepts at all levels of education.

Expand The Oregon Quality Award

In 1991, the Oregon Legislature directed the Economic Development Department to develop an awards program to recognize and reward firms that successfully employ high performance practices. The award is to be modeled after the Malcolm Baldrige National Quality award which has been won by companies like Xerox and Federal Express. Through what it calls the Oregon Quality Initiative, the department is currently working with business leaders, community colleges, and others to design the award.

Companies that have applied for the Baldrige Award claim that preparing to meet the requirements of the award application is the most rewarding part of the process, because it causes the company to fully examine how it puts quality into its processes and products. Unfortunately many firms do not apply, because only one firm per year will be recognized, even though every applicant will have made a considerable investment in the application process.

Oregon could bypass this barrier to participation by designing its award so that all firms that meet the award's high standards are recognized. By making the award more like a high performance certification program, more firms may be willing to participate and more importantly, more firms will become involved in adopting high performance practices.

Another potentially beneficial twist on the award might be to add categories recognizing quality improvements in small firms, service firms, nonprofits, public agencies, and schools. Small business, the service sector, nonprofits, government, and education face different kinds of challenges in adopting the high performance model that set them apart from large manufacturing firms. Yet, their productivity improvement efforts are also important to increasing the competitiveness of the state's economy.

ISO 9000 -- Make It An Oregon Standard

Many Oregon firms must adopt ISO 9000 quality standards to trade internationally, but few firms know much about what ISO 9000 is or what it will take to get themselves certified. Moreover, only a very small number of consulting companies and individuals are available to help firms through the very technical certification process, and satisfying certification requirements prior to submitting an application for certification requires, on average, 12 to 24 months of intensive work within the firms.

The state might be able to help in these areas by sponsoring or organizing events to introduce firms to ISO 9000 and linking firms that want to become certified with consultants, colleges, or universities that can provide technical assistance. Since no program or general set of instructions exist for ISO 9000 implementation, the state may wish to initiate and support the development of a training program for ISO 9000 implementation. Key industry associations, the education community, and others could participate in the development and delivery of the program.

Because ISO 9000 appears to be here to stay and because it is becoming an international requirement, the state might also wish to consider drafting an Oregon Benchmark for ISO 9000 adoption which recognizes broad certification as a vital part of the state's strategy for industry competitiveness.

PERFORMANCE PROFILES

OREGON COMPANIES GO HIGH PERFORMANCE

Big companies like Xerox, Federal Express, and IBM are not the only ones making an investment in high performance practices. A number of Oregon firms are making major strides toward transitioning to the high performance model. Below are profiles of five Oregon manufacturers that have made a commitment to high performance. They range in size from 60 to 560 employees and produce a variety of products including aluminum, laminated pressboard, and photographs.

Although the profiled firms are involved in manufacturing, high performance also has a place in retail and service firms. Companies like Nordstrom, Les Schwabe Tires, and Starbucks coffee shops have established very competitive positions by adopting key customer service policies, offering top quality products, and making significant investments in worker training. They too deserve mention for their success in adopting high performance practices.

The managers and employees of the profiled firms made generous contributions of time for interviews and in some cases, tours of their facilities, in order to enhance the understanding of the Joint Legislative Committee on Trade and Economic Development and give substance to the content of this report. Management consultants Ray Redburn, Richard Bittinger, and Janice Johnson also contributed their expertise to this effort, including participating in a Trade Committee hearing held at Warn Industries and OECO. Their contributions are appreciated.

WARN INDUSTRIES

- **Manufacturer of 4WD hubs, winches, bed liners**
- **Owner: Mike Warn**
- **City: Milwaukie**
- **Employees: 440**
- **Sales: $50 million**

Warn Industries, founded in 1948, manufactures hubs for 4-wheel-drive vehicles, winches, and other after-market vehicle parts. Warn is the exclusive supplier of hubs for the popular Ford Explorer. Warn Industries was in good financial condition when its owner, Mike Warn, decided to reorganize the company around the high performance model. In fact, Ford Motor Company had just given Warn a *Q1 Status* award for quality.

But Mike was concerned that the company had not developed a new product in years, and he wanted to be sure the company kept improving product quality. He began to investigate productivity improvement programs and quality management techniques. After six months of research, in July of 1990, Mike restructured the company on paper, "fired" all of his employees, and then rehired them into the jobs that would be available in a new high performance Warn Industries.

Warn workers were reorganized into three types of teams: Product/Market Teams that have responsibility for specific Warn products; Service Teams that serve the Product/Market Teams with personnel and accounting services; and Transition Teams that cover support activities such as facility maintenance, managing the stockroom, and receiving new shipments. All teams have been given decision-making authority for production scheduling, ordering supplies, customer service, and day-to-day operations.

Teams at Warn are separated from company president Mike Warn by only one layer of management called the Strategic Business Unit. This unit has four members: a manager for after-market products; one for the original equipment manufacturers served by Warn, including Ford, General Motors, and Nissan; another for Aerocover, Warn's specialty truck bed cover; and a manager for CIM, which stands for commercial, industrial, and military components. Warn manufactures such items as the winch used on the Hummer overland military vehicle.

Old company standards were done away with in the new organization. The time clock was bronzed, most titles were abolished, and performance evaluations were discontinued. Most middle management positions were replaced by team leader positions. Mike selected employees to fill these positions for the first teams, and team leaders were later ratified by workers. Warn managers expect that teams will elect their own leaders in the future.

All Warn employees needed training to help them function effectively and carry out added responsibilities in the new work environment. Workers were provided with many hours of paid training in Just In Time management, Employee Involvement, and Total Quality Control at the beginning of the transition. These courses were provided by knowledgeable Warn employees. All new employees are required to complete the same training.

Warn continues to provide paid training to workers to improve specific work skills, such as blueprint reading, shop math, basic math, and communications. Classes are taught on-site by instructors from Clackamas Community College, and workers receive college credit for completing the classes. Warn has chosen to use the community college to deliver credited training courses, because it provides employees with an incentive to pursue additional education on their own.

In addition to formal classroom training, Warn employees have been cross-training within their teams and developing worksite standards for all jobs. The standards will establish the level of skill workers must achieve to become certified in each of the primary work activities of the teams. The standards cover items such as the required minimum number of hours on a machine, demonstrated knowledge about a certain process, and quality levels for work products.

Rewarding workers for improving their skills is company policy at Warn, and three new incentive programs support the policy. First, the company adopted a program that employees call the "more you learn, the more you earn" program. Workers can raise their wages by increments of 75 cents to one dollar per hour for each new technical or administrative skill they master. Second, Warn will reimburse employees for the cost of tuition and books for *any* education class they take on their own time and pass with a C grade or better. Classes do not have to be related to the

employee's work at Warn. Third, the company shares 15 percent of after-tax profits with its employees. Profits are equally distributed, consistent with the view that all workers are equally important to the success of the firm.

Workers and managers alike are excited about the changes and the additional responsibility the reorganization has given them. Many appreciate the variety it has added to their jobs. Such positive feelings might seem unexpected in light of the fact that a significant number of Warn employees have been with the firm for over 20 years. The impact on company performance has been positive: Mike reports that annual sales are up 12 percent, gross margin has grown 3 to 4 percent, and inventories are down 30 percent due to Just In Time. Profits have increased substantially, according to Mike. Maybe even more important, Mike estimates that his employees have developed "more new products in the last year, than in the last five years combined. Empowering workers in the reorganization has really released their creativity."

The company's goals for the future are high. Workers are trying to raise quality and service to the level required to earn Ford Motor Company's highest quality award, and Warn also plans to apply for the Malcolm Baldrige National Quality award.

OECO

- **Manufactures power conversion electronics**
- **Owner: Jim Coonan**
- **City: Milwaukie**
- **Employees: 560**
- **Sales: $42 Million**

OECO Corporation was established in 1946. It designs and manufactures power conversion electronics--components that convert electric current from alternating to direct and that step electricity up or down from one voltage to another. The company manufactures parts for original equipment manufacturers in the defense and commercial fields of aerospace, computers, test measurement, and telecommunications.

When OECO decided to adopt the high performance model in 1990, the company was in financial trouble. Sales were plummeting as the federal government cut defense spending and the overall electronics industry suffered its first-ever downturn. OECO management knew the company would have to scale back dramatically and work harder on sales in the commercial market, if it was going to survive. Management decided to do more than simply layoff workers. They decided to adopt the high performance model and restructure the company.

Before 1990, OECO was organized by function, with departments for mechanical engineering, electrical engineering and other disciplines. It also had 60 quality control inspectors. Communication between departments was difficult, and meetings took up to two weeks to arrange (the company was considering buying

software specially designed to schedule meetings). Quality control took the form of inspections which occurred mostly at the end of the production process, when it was most difficult to determine the cause of a problem and make changes.

In order to transition to high performance, OECO President Jim Coonan reorganized the company's operations starting with a blank piece of paper. Employees were selected to fill open positions in the "new" firm. Approximately one-half of OECO's workers rejoined the company. Employees now work in what the company calls "cross-functional design teams" and "focused factories" that are dedicated to specific OECO customers. Teams are named after OECO customers, such as the Digital Team, the Tandem Team, and the Unisys Team. The term cross-functional refers to the fact that teams are made up of employees with varied functional expertise. On the factory floor, cross functional groups are teamed into focused factories with their desks arranged around long meeting tables. Whenever the group needs to jointly discuss a problem, members literally turn around their chairs and pull up to the meeting table.

Customer service has improved as a result of the reorganization. Customers are extended an open invitation to visit the company and spend time with the teams that build their products. Team leaders are required to call customers at least once each week. According to some managers, putting customers together with the OECO team suppliers has been the biggest benefit from the reorganization. Serving customers has become a key priority for teams who claim that now OECO "can beat (the competition) on customer service, if not everything else."

Training was the most significant investment OECO made in adopting the high performance model. The training program was divided into two phases. All OECO employees were the focus of Phase I which provided training in team building, conflict management, communications, and statistical tools that would help employees improve the quality and efficiency of their work.

Teams and managers have been taught how to conduct their own quality control and build quality into the product as it is being built. Training focused on "performance measures that are really critical to the success of our products," according to an OECO technician, "especially things we can measure, such as our parts per million defect rate." Results are impressive: OECO has reduced its scrap and reject rate from nine percent of sales to three percent while reducing the number of quality inspectors from sixty to five. The new company motto for quality control is, "Do it right the first time."

Phase II training is focused on bringing about a cultural change in OECO's management, according to Jim Coonan. "Our mid- and upper-level managers are being taught to see themselves as leaders and coaches instead of foremen and supervisors," he explained. The company is providing management with training in empowerment management methods.

High performance is making a difference at OECO. Prior to reorganizing, OECO was running in the red, but Jim Coonan reports that the company is now profitable--a significant achievement for a firm in his industry these days. The company is optimistic about the future and is setting high goals for continuing to

improve its record in on-time delivery, repair and rejection rates, sales per employee, and nearly fifty other new performance measures.

ASHTON PHOTO

- **Professional photo processing lab**
- **Owner: Steve Ashton**
- **City: Salem**
- **Employees: 165 seasonal maximum**
- **Sales: $7 million**

Steve Ashton, owner of Ashton Photo, recalls what he calls "the old days" at his photo processing lab in Salem when "the company was set up in little departments where people did little repetitive tasks all day long."

"It wasn't a fun place to work," he says. "People didn't have to use their minds; everything had been thought through for them. And, everyone blamed everyone else whenever things went wrong, because they didn't know what anybody else was doing."

Steve decided his company needed to change, and he began researching different factory models in the U.S. and Japan. When the research was done, he announced to his employees that they would be reorganizing the shop floor in to U-shaped work centers where employees would begin to work in teams of five to nine workers. The small U-shaped work areas made it possible for employees to see one another and manage a larger part of the production process. They permit employees to work closely together and discuss problems easily.

Teams were made responsible for all aspects of customer orders, instead of single functions like photo editing or cropping. They began cross training in order to improve their efficiency, and they have been trained in quality control and customer service. The training program for new employees takes 13 weeks, and begins with a week of meetings with the leaders of each of the company's departments such as finance, human resources, sales and marketing, engineering, and production, so that the new employee understands how the company is organized and who to go to for what services or information. During the next twelve weeks of the program, the employee is exposed to every skill required to do the work accomplished by the department into which he or she has been hired. After that, the employee will begin on-the-job training in the job for which they were hired. Steve says this training system produces employees who understand fully how the company works.

Compensation was changed at Ashton to reflect a new emphasis on learning. Pay is now skill-based to encourage workers to learn new skills and improve their flexibility. An interesting twist to Ashton's pay system is that employee's are paid for skills they develop, even if they do not use those skills on the job. As Steve explains, "In the photo industry, technology changes rapidly and the more skilled our workers are and especially if they are constantly learning new skills, the better they adapt to all of the technological changes." In addition to skill-based pay, the compensation program was expanded to include stock ownership and employee bonus programs.

A significant part of the change in company policy at Ashton involved a change in attitude about worker mistakes. Rather than view them as something to hide, employees are encouraged to report their mistakes and discuss them with team members so that everyone can learn from them. Steve calls it the "no excuses, no blame" policy. No one is blamed for making a mistake they admit. Only hiding a mistake will get a worker into trouble, according to Steve.

Ashton Photo has seen dramatic productivity improvements since it adopted the high performance model. Production increased 18 percent in 1991, sales have almost tripled, and profits are up several hundred percent. "High performance is really a change in philosophy," says Steve, "and any firm can do it."

DOMTAR DECORATIVE PANELS, INC.

- **Manufactures laminated particleboard**
- **Owner: Domtar, Inc. based in Quebec**
- **City: Albany**
- **Employees: 60**
- **Sales: $12 million**

Domtar Decorative Panels, Inc. is a new secondary wood products manufacturer in Albany and a wholly owned division of Domtar Inc. in Quebec. The Albany plant makes laminated particle board used to construct cabinets and furniture.

Unlike Warn or OECO, Domtar adopted the high performance model at the beginning of its operations. Employees were hired in January of 1990 and spent the next three months in training, learning about teamwork, quality control, and production. "They didn't produce their first product until April," according to Allan Adrian, the company's financial and administrative manager. But, the investment was worthwhile: sales topped 10 million square feet in 1990 and 32.8 million in 1991; projections for 1992 are at 44 million square feet.

As in other high performance firms, Domtar employees are organized in teams, taught quality management techniques, and have broad responsibility for production and personnel matters. The company budgets two hours of training per person per week, and compensation is based on how many skills workers have mastered. In order to promote cross-training, workers are allowed to rotate jobs without losing pay. Workers participate in hiring and firing decisions, and they elect new team leaders every quarter. Allan calls the system "team management."

Domtar has hired all of its employees locally, through the Albany Employment Office which was "very helpful." Many of the employees were dislocated mill workers and loggers. Allan said the "quality of the people here is astounding," and that the employees have blossomed in the high performance environment. Employees are taught that the company "really believes in the Deming principle that 80 percent of all problems are in the manufacturing process and only 20 percent are people-related." Workers are given primary responsibility for coming up with ideas and solutions for the 80 percent.

NORTHWEST ALUMINUM

- **An aluminum smelting operation**
- **Owner: Brett Wilcox**
- **City: The Dalles**
- **Employees: 410 Union: U.S. Steelworkers**
- **Sales: over $5 million**

When the former Martin Marietta aluminum reduction plant in The Dalles was purchased by Brett Wilcox in 1986, "the industry had written this plant off," according to Brett. "It was too small, had old technology, and a reputation for bad labor relations," he explained. The smelter hadn't turned a profit in some time, and had been for sale for two years. But Brett, the union, and the workers at what is now the Northwest Aluminum Company changed all that.

Martin-Marietta, a Maryland conglomerate, ran the old aluminum plant from a distance. Plant managers were answerable to corporate offices in Maryland for most major decisions. Today, Northwest Aluminum's president works on site, and the company is privately held.

One of the first things Brett did to turn the plant around was improve relations with the union and its workers. A profit sharing system was introduced that provides 17 percent of profits to workers, and dedicates an additional 3 percent to a 401K retirement plan for workers. Although the guaranteed annual wage is less than it was when the plant was owned by Martin Marietta, in good years, profit sharing payments have equaled the plant's average base salary which was about $27,000.

Saving the plant required a reduction in employees, but rather than cut frontline workers, Brett opted to reduce management. Most middle management positions, including room and line supervisors and foremen, were eliminated, and the workforce was reduced from 660 to 365. More resources and responsibility were given to workers who were directly involved in aluminum production. Brett says that his workers "rose to the occasion--they knew their jobs and they were the best ones to decide how to make them better." Today, workers enjoy a more democratic work environment, including authority to vote to change work shifts.

Communication was improved, beginning with an invitation to workers to help draft the company's mission statement. The original is written on a greaseboard that is now framed behind glass and hangs in the company's reception area. Management continues to include workers in company decision-making by having hourly workers attend high level staff meetings and circulating meeting minutes to all workers.

Workers at Northwest Aluminum are still represented by United Steel Workers, but a new attitude prevails. Local officers are active participants in and supporters of high performance changes. Absenteeism is down, and grievances, formerly averaging 30 per month, have totaled four since 1986.

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